

WHAT IS CLAIMED IS:

1. A method of conveying fibrous insulation material comprising the steps of:
providing an air flow stream;
selectively introducing fibrous insulation material into the air flow stream whereby the material can be selectively conveyed for application as insulation;
sensing the actual air flow stream velocity; and,
comparing the actual air flow stream velocity with a desired air stream velocity and
selectively adjusting the air flow stream in response to a differential between the actual and the desired air flow stream velocities.
2. The method of claim 1 further comprising the step of selectively adjusting the rate of introducing fibrous insulation material to the air flow stream in response to a differential between the actual and desired air flow stream velocities.
3. The method of claim 1 further comprising the step of sensing the actual pressure in the air flow stream and comparing the actual pressure in the air flow stream with a desired pressure and selectively adjusting the rate of introducing fibrous insulation material into the air flow stream.
4. The method of claim 1 wherein, during the step of adjusting the air flow stream, a portion of the air stream is selectively allowed to escape to the atmosphere.
5. The method of claim 1 wherein a variable speed blower provides the air flow stream and wherein, during the step of adjusting the air flow stream, the blower speed is selectively adjusted.
6. The method of claim 1 wherein a blower provides the air flow stream and also

provides an air vacuum stream, and further comprising the steps of vacuuming fibrous insulation material with said air vacuum stream and separating the vacuumed material from the air vacuum stream prior to said air vacuum stream entering said blower.

7. The method of claim 6, further comprising the step of selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator in response to a differential between the actual and desired air flow stream velocities.

8. The method of claim 6, further comprising the step of selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator whereby an air vacuum stream is selectively provided through the separator for vacuuming fibrous insulation material.

9. The method of claim 1 wherein a metering orifice is provided in the air flow stream downstream of selectively introducing the fibrous insulation material to the air flow stream, and further comprising the steps of measuring the air stream pressure downstream and upstream of the metering orifice and determining the actual air flow stream velocity by comparing the values of the downstream and upstream air flow stream pressures.

10. The method of claim 1 wherein a sensing vane is provided in the air flow stream upstream of selectively introducing fibrous insulation material to the air flow stream and further comprising the step of measuring the deflection of the sensing vane, thereby sensing the actual air flow stream velocity.

11. The method of claim 1 wherein, during the step of adjusting the air flow stream, a portion of the air stream is selectively allowed to escape to the atmosphere, and further wherein a metering orifice is provided in the air flow stream downstream of selectively introducing the

fibrous insulation material to the air flow stream, and further comprising the steps of measuring the air stream pressure downstream and upstream of the metering orifice and determining the actual air flow stream velocity by comparing the values of the downstream and upstream air flow stream pressures.

12. The method of claim 11 further comprising the step of selectively adjusting the rate of introducing fibrous insulation material to the air flow stream in response to a differential between the actual and desired air flow stream velocities.

13. The method of claim 11 further comprising the step of sensing the actual pressure in the air flow stream and comparing the actual pressure in the air flow stream with a desired pressure and selectively adjusting the rate of introducing fibrous insulation material into the air flow stream.

14. The method of claim 11 wherein a blower provides the air flow stream and also provides an air vacuum stream, and further comprising the steps of vacuuming fibrous insulation material with said air vacuum stream and separating the vacuumed material from the air vacuum stream prior to said air vacuum stream entering said blower.

15. The method of claim 14 further comprising the step of selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator in response to a differential between the actual and desired air flow stream velocities.

16. The method of claim 11 further comprising the step of providing a programmable logic controller and a touch screen interface for selectively controlling said method steps.

17. The method of claim 1 further comprising the step of providing a programmable logic controller for controlling said method steps.

18. The method of claim 17 further comprising the step of providing a touch screen interface with said programmable logic controller allowing an operator to selectively control said method steps.

19. A method of conveying fibrous insulation material comprising the steps of:
providing an air flow stream;
selectively introducing fibrous insulation material into the air flow stream whereby the material can be selectively conveyed for application as insulation;
sensing the actual pressure in air flow stream; and,
comparing the actual air flow stream pressure with a desired air stream pressure and selectively adjusting the air flow stream in response to a differential between the actual and the desired air flow stream pressures.

20. The method of claim 19 further comprising the step of selectively adjusting the rate of introducing fibrous insulation material to the air flow stream in response to a differential between the actual and desired air flow stream pressures.

21. The method of claim 19 wherein, during the step of adjusting the air flow stream, a portion of the air stream is selectively allowed to escape to the atmosphere.

22. The method of claim 19 wherein a variable speed blower provides the air flow stream and wherein, during the step of adjusting the air flow stream, the blower speed is selectively adjusted.

23. The method of claim 19 wherein a blower provides the air flow stream and also provides an air vacuum stream, and further comprising the steps of vacuuming fibrous insulation material with said air vacuum stream and separating the vacuumed material from the air vacuum

stream prior to said air vacuum stream entering said blower.

24. The method of claim 23, further comprising the step of selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator in response to a differential between the actual and desired air flow stream pressures.

25. The method of claim 23, further comprising the step of selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator whereby an air vacuum stream is selectively provided through the separator for vacuuming fibrous insulation material.

26. The method of claim 19 further comprising the step of providing a programmable logic controller for controlling said method steps.

27. The method of claim 26 further comprising the step of providing a touch screen interface with said programmable logic controller allowing an operator to selectively control said method steps.

28. A method of conveying and vacuuming fibrous insulation material comprising the steps of:

providing an air flow stream upstream of a blower and an air vacuum stream downstream of said blower;

selectively introducing fibrous insulation material into the air flow stream thereby conveying the material for application as insulation;

vacuuming fibrous insulation material with said air vacuum stream; and,

separating the vacuumed material from the air vacuum stream prior to said air vacuum stream entering said blower.

29. The method of claim 28, further comprising the steps of:
sensing the actual air flow stream velocity; and,
comparing the actual air flow stream velocity with a desired air stream velocity and
selectively adjusting the air flow stream in response to a differential between the actual and the
desired air flow stream velocities.

30. The method of claim 29, further comprising the step of selectively drawing
atmospheric air into the air vacuum stream downstream of the blower and upstream of the
separator in response to a differential between the actual and desired air flow stream velocities.

31. The method of claim 29 further comprising the step of selectively adjusting the rate
of introducing fibrous insulation material to the air flow stream in response to a differential
between the actual and desired air flow stream velocities.

32. The method of claim 29 wherein, during the step of adjusting the air flow stream, a
portion of the air stream is selectively allowed to escape to the atmosphere.

33. The method of claim 29 wherein a variable speed blower provides the air flow
stream and wherein, during the step of adjusting the air flow stream, the blower speed is
selectively adjusted.

34. The method of claim 29 wherein a metering orifice is provided in the air flow
stream downstream of selectively introducing the fibrous insulation material to the air flow
stream, and further comprising the steps of measuring the air stream pressure downstream and
upstream of the metering orifice and determining the actual air flow stream velocity by comparing
the values of the downstream and upstream air flow stream pressures.

35. The method of claim 29 wherein a sensing vane is provided in the air flow stream

upstream of selectively introducing fibrous insulation material to the air flow stream and further comprising the step of measuring the deflection of the sensing vane, thereby sensing the actual air flow stream velocity.

36. The method of claim 29 further comprising the step of sensing the actual pressure in the air flow stream and comparing the actual pressure in the air flow stream with a desired pressure and selectively adjusting the rate of introducing fibrous insulation material into the air flow stream.

37. The method of claim 28, further comprising the step of selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator whereby an air vacuum stream is selectively provided through the separator for vacuuming fibrous insulation material.

38. The method of claim 28, further comprising the step of sensing the vacuum in said air vacuum stream downstream of said blower and selectively drawing atmospheric air into the air vacuum stream downstream of the blower and upstream of the separator in response to said sensed vacuum.

39. The method of claim 28 further comprising the step of providing a programmable logic controller for controlling said method steps.

40. The method of claim 39 further comprising the step of providing a touch screen interface with said programmable logic controller allowing an operator to selectively control said method steps.

41. An apparatus for conveying fibrous insulation material, said apparatus comprising:

an air blower having an air inlet and an air outlet, said blower drawing air through said air inlet and providing an air flow stream at said air outlet;

a feeder having a fibrous insulation material inlet, an air inlet connected to said air blower outlet and a material and air mixture outlet, whereby fibrous insulation material is selectively introduced into the air flow stream and is conveyed out through the material and air mixture outlet for application as insulation;

an air flow pressure sensor between the blower outlet and the feeder air inlet; and,
an air valve between the blower outlet and the feeder air inlet, said air valve communicating with the atmosphere and being selectively controlled responsive to said air flow pressure sensor, whereby the air flow delivered to said feeder is selectively controlled.

42. The apparatus of claim 41, further comprising a fibrous insulation material separator having an air and material mixture inlet, a material outlet and an air outlet connected to said inlet of said air blower, wherein a vacuum is provided at said separator air and material mixture inlet wherethrough fibrous insulation is vacuumed, whereby said air blower provides both an air vacuum stream through said separator and an air flow stream to said feeder.

43. The apparatus of claim 42, further comprising a vacuum relief valve connected to said air blower inlet selectively providing atmospheric air to said air blower inlet in the event a predetermined vacuum is exceeded.

44. The apparatus of claim 42, further comprising a vacuum sensor between the blower inlet and the separator outlet, an air vacuum valve connected between the blower inlet and the atmosphere, and wherein said air vacuum valve is selectively controlled responsive to said vacuum sensor.

45. The apparatus of claim 44 wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

46. The apparatus of claim 44 further comprising a vacuum relief valve connected to said air blower inlet selectively providing atmospheric air to said air blower inlet in the event a predetermined vacuum is exceeded, and a pressure relief valve connected to said air blower outlet selectively allowing air from the air flow stream to escape to the atmosphere in the event a predetermined pressure is exceeded.

47. The apparatus of claim 42 wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

48. The apparatus of claim 41 further comprising a pressure relief valve connected to said air blower outlet selectively allowing air from the air flow stream to escape to the atmosphere in the event a predetermined pressure is exceeded.

49. The apparatus of claim 41 wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

50. The apparatus of claim 41 further comprising a programmable logic controller receiving control signals from said air pressure sensor and controlling said air valve.

51. The apparatus of claim 50 further comprising a touch screen interface connected to said programmable logic controller.

52. An apparatus for conveying fibrous insulation material, said apparatus

comprising:

an air blower having an air inlet and an air outlet, said blower drawing air through said air inlet and providing an air flow stream at said air outlet;

a feeder having a fibrous insulation material inlet, an air inlet connected to said air blower outlet and a material and air mixture outlet, whereby fibrous insulation material is selectively introduced into the air flow stream and is conveyed out through the material and air mixture outlet for application as insulation;

an air flow velocity sensor between the blower outlet and the feeder air inlet; and,

an air valve between the blower outlet and the feeder air inlet, said air valve communicating with the atmosphere and being selectively controlled responsive to said air flow velocity sensor, whereby the air flow delivered to said feeder is selectively controlled.

53. The apparatus of claim 52, further comprising a fibrous insulation material separator having an air and material mixture inlet, a material outlet and an air outlet connected to said inlet of said air blower, wherein a vacuum is provided at said separator air and material mixture inlet wherethrough fibrous insulation is vacuumed, whereby said air blower provides both an air vacuum stream through said separator and an air flow stream to said feeder.

54. The apparatus of claim 53, further comprising a vacuum relief valve connected to said air blower inlet selectively providing atmospheric air to said air blower inlet in the event a predetermined vacuum is exceeded.

55. The apparatus of claim 53, further comprising a vacuum sensor between the blower inlet and the separator outlet, an air vacuum valve connected between the blower inlet and the atmosphere, and wherein said air vacuum valve is selectively controlled responsive to said

vacuum sensor.

56. The apparatus of claim 55 wherein said air flow velocity sensor comprises a metering orifice in the air flow stream between the blower outlet and the feeder air inlet and pressure sensors located downstream and upstream of the metering orifice, whereby air flow stream velocity is determined by comparing the values of the downstream and upstream air flow stream pressures.

57. The apparatus of claim 56 further comprising a pressure sensor in the air flow stream between the blower outlet and the feeder air inlet and wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

58. The apparatus of claim 55 further comprising a vacuum relief valve connected to said air blower inlet selectively providing atmospheric air to said air blower inlet in the event a predetermined vacuum is exceeded, and a pressure relief valve connected to said air blower outlet selectively allowing air from the air flow stream to escape to the atmosphere in the event a predetermined pressure is exceeded.

59. The apparatus of claim 55 further comprising a pressure sensor in the air flow stream between the blower outlet and the feeder air inlet and wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

60. The apparatus of claim 53 wherein said air flow velocity sensor comprises a metering orifice in the air flow stream between the blower outlet and the feeder air inlet and pressure sensors located downstream and upstream of the metering orifice, whereby air flow

stream velocity is determined by comparing the values of the downstream and upstream air flow stream pressures.

61. The apparatus of claim 52 wherein said air flow velocity sensor comprises a metering orifice in the air flow stream between the blower outlet and the feeder air inlet and pressure sensors located downstream and upstream of the metering orifice, whereby air flow stream velocity is determined by comparing the values of the downstream and upstream air flow stream pressures.

62. The apparatus of claim 52 wherein said air flow velocity sensor comprises a sensing vane in the air flow stream between the blower outlet and the feeder air inlet adapted to proportionally deflect in response to increasing air flow velocity.

63. The apparatus of claim 52 further comprising a pressure relief valve connected to said air blower outlet selectively allowing air from the air flow stream to escape to the atmosphere in the event a predetermined pressure is exceeded.

64. The apparatus of claim 52 further comprising a pressure sensor in the air flow stream between the blower outlet and the feeder air inlet and wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

65. The apparatus of claim 52 wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow velocity sensor.

66. The apparatus of claim 52 further comprising a programmable logic controller receiving control signals from said velocity sensor and controlling said air valve.

67. The apparatus of claim 66 further comprising a touch screen interface connected to said programmable logic controller.

68. An apparatus for conveying and vacuuming fibrous insulation material, said apparatus comprising:

an air blower having an air inlet and an air outlet, said blower providing an air vacuum stream at said air inlet and an air flow stream at said air outlet;

a feeder having a fibrous insulation material inlet, an air inlet connected to said air blower outlet and a material and air mixture outlet, whereby fibrous insulation material is selectively introduced into the air flow stream and is conveyed out through the material and air mixture outlet for application as insulation;

a fibrous insulation material separator having an air and material mixture inlet, a material outlet and an air outlet connected to said inlet of said air blower, wherein a vacuum is provided at said separator air and material mixture inlet wherethrough fibrous insulation is vacuumed, whereby said air blower provides both an air vacuum stream through said separator and an air flow stream to said feeder.

69. The apparatus of claim 68, further comprising:

an air flow velocity sensor between the blower outlet and the feeder air inlet; and,

an air valve between the blower outlet and the feeder air inlet, said air valve communicating with the atmosphere and being selectively controlled responsive to said air flow velocity sensor, whereby the air flow delivered to said feeder is selectively controlled.

70. The apparatus of claim 68, further comprising a vacuum sensor between the blower inlet and the separator outlet, an air vacuum valve connected between the blower inlet and

the atmosphere, and wherein said air vacuum valve is selectively controlled responsive to said vacuum sensor.

71. The apparatus of claim 70 further comprising a vacuum relief valve connected to said air blower inlet selectively providing atmospheric air to said air blower inlet in the event a predetermined vacuum is exceeded, and a pressure relief valve connected to said air blower outlet selectively allowing air from the air flow stream to escape to the atmosphere in the event a predetermined pressure is exceeded.

72. The apparatus of claim 70 further comprising a pressure sensor in the air flow stream between the blower outlet and the feeder air inlet and wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

73. The apparatus of claim 68 further comprising a pressure relief valve connected to said air blower outlet selectively allowing air from the air flow stream to escape to the atmosphere in the event a predetermined pressure is exceeded.

74. The apparatus of claim 68 further comprising a pressure sensor in the air flow stream between the blower outlet and the feeder air inlet and wherein the rate at which said fibrous insulation material is selectively introduced into the air flow stream is controlled responsive to said air flow pressure sensor.

75. An apparatus for conveying fibrous insulation material, said apparatus comprising:
a variable speed air blower having an air inlet and an air outlet, said blower drawing air through said air inlet and providing an air flow stream at said air outlet;

a feeder having a fibrous insulation material inlet, an air inlet connected to said air blower outlet and a material and air mixture outlet, whereby fibrous insulation material is selectively introduced into the air flow stream and is conveyed out through the material and air mixture outlet for application as insulation;

an air flow velocity sensor between the blower outlet and the feeder air inlet; and,

wherein the speed of said blower is controlled responsive to said air flow velocity sensor, whereby the air flow delivered to said feeder is selectively controlled.

76. An apparatus for conveying fibrous insulation material, said apparatus comprising:

a variable speed air blower having an air inlet and an air outlet, said blower drawing air through said air inlet and providing an air flow stream at said air outlet;

a feeder having a fibrous insulation material inlet, an air inlet connected to said air blower outlet and a material and air mixture outlet, whereby fibrous insulation material is selectively introduced into the air flow stream and is conveyed out through the material and air mixture outlet for application as insulation;

an air flow pressure sensor between the blower outlet and the feeder air inlet; and,

wherein the speed of said blower is controlled responsive to said air flow pressure sensor, whereby the air flow delivered to said feeder is selectively controlled.